Synopsis for Pre-Ph.D. Registration

Analysis of Phyto-chemicals, Antifungal and Antibacterial properties in selected Lac host plants of Ranchi district.

Submitted by,

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STATE OF ART:

Though Lac is a minor forest product, it has a diverse range of utilities. It is a secondary secretory product of the insect *Kerria lacca* (Kerr.) which it produces with the view to fend itself. The unique texture and other properties make it fitful for uses in large varieties of industries.

In the forests of Jharkhand and elsewhere, there are many trees that give shelter to the lac insect. Some of them produce large quantities of Lac, some in moderate while others do not attract the lac insects altogether.

It was then worthwhile to note that the level of affinities between the lac host and lac insects must have been a factor of secondary metabolite produced by the lac hosts and other plants.

Our present research aims to ponder in the arena of phytochemicals present in them and find the antifungal and antibacterial properties in them against various plant pathogens. While doing the analysis of the chemicals, the result may throw light on the direct and indirect reasons that are instrumental in having a relationship with the lac insect.

The present study will be conducted on the lac host plants of Ranchi district. The district Ranchi is located at23.3441° N, 85.3096° E. It has an average elevation of 651 m. The district is located in the Southern Chotanagpur plateau. It has a hilly topography and have a dense tropical forest which provides it a moderate climate compared to other parts of the state. Apart from its richness in forest diversity and its produce, it is also rich in tribal communities, hence, it could be said that this area is a rich source in the field of ethno-medicine.

PROBLEM TO BE INVESTIGATED

The problems to be investigated are as follows -

- To investigate the lac host plants found in Ranchi district.
- To explore the phytochemicals present in the selected Lac host and Lac non host plants taken as control.
- To investigate if there is any new phytocompound present in the selected plants.
- To compare the quantity of phytochemicals present in the selected host and the non host plants.
- To check and compare the antifungal properties present in the selected plant specimens.
- To check and compare the antibacterial properties present in the selected plant specimens.

OBJECTIVE OF INVESTIGATION AND MOTIVATION

The objectives of this investigation are :

1. To explore the major and minor Lac host plants found in Ranchi district.

2. To analyse the quality and quantity of the phytochemical constituents in the selected parts of the Lac host plants and Lac non host plants.
3. To compare the antifungal properties in the selected Lac host plants against selected phytopathogenic fungi.
4. To compare the antibacterial properties in the selected Lac host plants against selected phytopathogenic bacteria.

HYPOTHESIS

Since only a few plants attract lac insects towards them and are very crucial for the life cycle of these lac insects, these plants must be having some phytochemicals which draw these insects towards themselves. These lac insects majorly depend on these plants for shelter and protection which in turn is helpful in maintaining their colonial number and these phytochemicals must be having some protective functions like antifungal and antibacterial properties towards the egg and the developing larva of these insects.

These phytochemicals could hence also be helpful for the mankind.

The proposed investigation will help to discover new areas of medicine for the treatment of various fungal and bacterial diseases.

The present work will also be helpful for us to understand about the susceptibility of these plants against the pathogens.

It will be helpful in finding out the yield potential of the host plant.

RESEARCH DESIGN AND METHODOLOGY

The methodology of this work is as follows :-

- **Area of study: Ranchi, Jharkhand, India**
- Selection of the plant material to be used for the investigation.
- Identification of the plants and collection of the aerial plant parts of the selected Lac host and Lac non host plants.
- Preparation of extracts of the material.
- Phyto chemical screening of different solvent extracts of the parts of the selected plants.
- Purchase of the test organism
- Preparation of the culture media.
- Maintenance of the fungal and bacterial culture.
- Evaluation of the antifungal property in some aerial plant parts.
- Evaluation of the antibacterial property in some aerial plant parts.

MATERIALS TO BE USED IN THE COLLECTION OF DATA

Plant materials

Lac host plants
Lac non host plant
Test fungus
Test bacteria

Apparatus required

Petri dish
Measuring cylinder
Conical flask
Beaker
Mortar and pestle
Watch glass
Eppendorf tube
Microslides
Coverslip
Forcep
Inoculation loop
Burner
Filter paper
Match box
Measuring scale
Knife
Cotton
Muslin cloth
Glass spreader
Various chemicals

Machines required

Autoclave
Boiler
Weighing machine

Microscope
Soxhelet's apparatus
Laminar airflow chamber
Incubator

Water bath
Refrigerator
Spectrophotometer

SIGNIFICANCE OF THE STUDY

- Identification and isolation of active compounds found in the aerialparts of the Lac host plants responsible for the antifungal and antibacterial properties that could act as a good alternative of chemical fungicide, antibiotics, antifungal medicines and health supplements.
- The findings of the research will provide significant information in the treatment of various diseases.
- It will provide information about new sources of various biomolecules and may be even new biomolecules.
- It will help to find new herbal products of commercial value.
- It will act as a new lead in the field of herbal medicine.
- This will open new doors for the future researchers.
- The present study will provide a direction in elevating the production of Lac from the host plants.

IT'S RELEVANCE TO THE PRESENTDAY PROBLEMS AND NEED OF THE SOCIETY

- The world is diverse and it is rich in flora and fauna in terms of both plants and pathogens. Hence, the diseases caused by these pathogens is increasing day by day. Hence, it is required by us to find newer sources of secondary metabolites which could be processed to derive medicines out of it.
- The use and hence the need of lac is increasing day by day, but there are a limited plant species on which the Lac insects shelter on. Hence, it is probable that there must be certain chemical compounds present in these plants which drive these lac insects towards themselves and it is also evident that the amount of presence of these chemical compounds makes a plant a major or the minor host for these Lac insect species.

CONTRIBUTION TO THE EXISTING KNOWLEDGE

- Different phytochemicals extracted from Lac host plants could be helpful in treating various heath ailments.
- The present study will be helpful in pointing out the phytochemicals which could used in the field of biopesticide production.

- This will provide a direction to the biotechnologists for efficient gene manipulations for an elevated lac production.

FUTURE WORK

- More study is needed in the areas of isolation, purification and identification of specific active compounds responsible for the antifungal and antibacterial properties.
- Helpful in promoting research aiming at the search and development in agro industries based on natural products derived from plants.
- Different phytochemicals from the plants could be utilized as an alternative medicine in the treatment of various fungal and bacterial diseases.
- More studies will be required to link the affinity between the lac host and the lac insects.
- This will open new vistas in the field of bio pesticides.

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